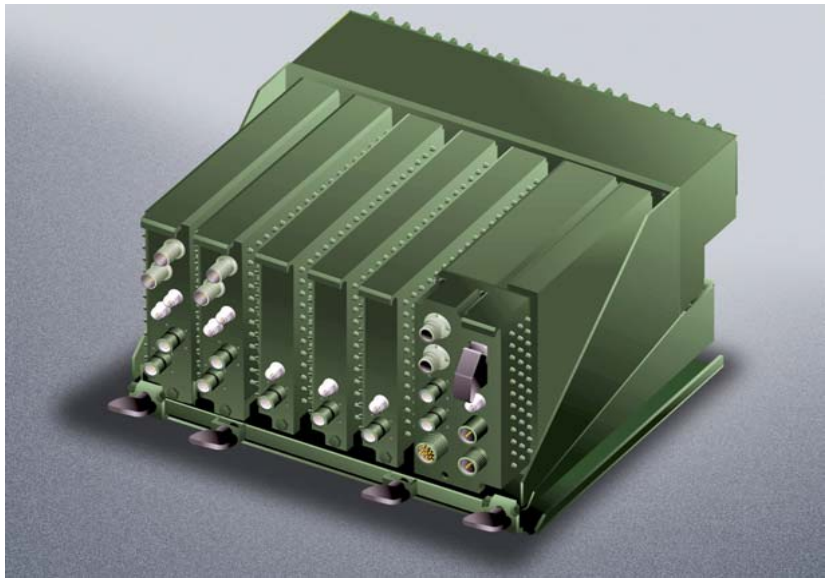
JTRS CLUSTER 1 RADIO SYSTEM
03 Dec 2002



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Agenda

- **JTRS PROGRAM OVERVIEW**
- **CLUSTER 1 PROGRAM OVERVIEW**
- **SUMMARY**

What is JTRS?

Objective: "Re-usable Waveforms that are Portable, Independent of Hardware and Operating System"

Legacy Radios


SINCGARS ($8-18K)


EPLRS ($29K)


MIDS/Link 16 ($200K)


Spit Fire/DAMA ($25K)


OTHERS…
HQ, VHF, HF, etc.,

Family of SW Radios

Hand Held | Manpack | Vehicular | Aviation | Maritime





Cluster 2 | **Cluster 1** | **Cluster 3**

Waveforms
- SINCGARS
- EPLRS
- DAMA
- HF SSB
- HAVE QUICK
- LINK 16
- VHF ATC
- **WNW**

- -Software Arch. Compliant
- -Interoperability
- -Cross-banding
- -Networked
- -New functionality in WNW
- -Full functionality of legacy Radios
- -Protocols/Standards
- -Flexibility/Independence
- -Many Waveforms per Radio

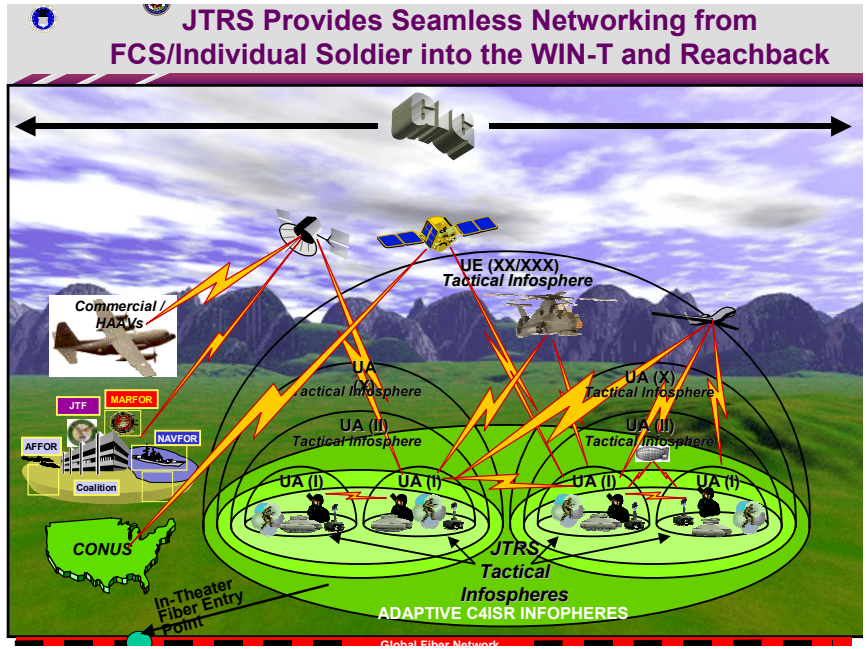
Significance for DOD

- **Powerful, Seamless Simple Mobile Networking**
- **Key to Joint and Coalition Interoperability**
- **Key Enabling Communications Capability for Future Combat System (FCS) and the Objective Force**
- **Wideband Networking Waveform (WNW) essential for Network Centric Operations**
- **Greater throughput to move more information faster**
- **Key to Army Aviation Recapitalization**
- **Training and logistics efficiencies through a single family of radios**
- **Fused information available to commander anywhere in the battlespace**

Single Radio Type Replaces Several Legacy Capabilities

Why JTRS?

- Interoperability
- Powerful, seamless, simple, mobile networking
- Automatic routing and retransmission
- Greater and faster throughput
- Enables battle command on the move
- Reduces targeting time for sensor to shooter links



- Reduced Command, Control, Communications, and Computers equipment footprint
- Reduces uncertainty in operations and decision making
- Simultaneous movement of voice, video, and data
- Untethers the commander from the Tactical Operations Center
- Training and logistics efficiencies through a single family of radios

Benefit to the Warfighter

INTEROPERABILITY – What is it?

Vision: **The Joint Tactical Radio System (JTRS) will provide a seamless, highly flexible, and adaptive communications capability, offering the means for total horizontal and vertical C4 system interoperability, for all radio sets and networks at all echelons for the 21st century warfighters, to insure full spectrum dominance, in peacetime and in war.**

Definition DOD 5000 Interim Guidance

Ability of communications-electronics equipment to exchange directly and satisfactorily between them and/or their users.

Definition CJCSI 3170B

The ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to make use the services, unit, or forces and to use the services so exchanged to enable them to operate effectively together.

Allows everybody to talk to everybody – Data and Voice

INTEROPERABILITY-What does it provide?

JTRS provides interoperability with Services, NATO and Coalition Forces

Wideband Networking Waveform

- Standard network for all US DOD Forces
- Available to NATO (upon their approval)

Standard NATO Waveforms

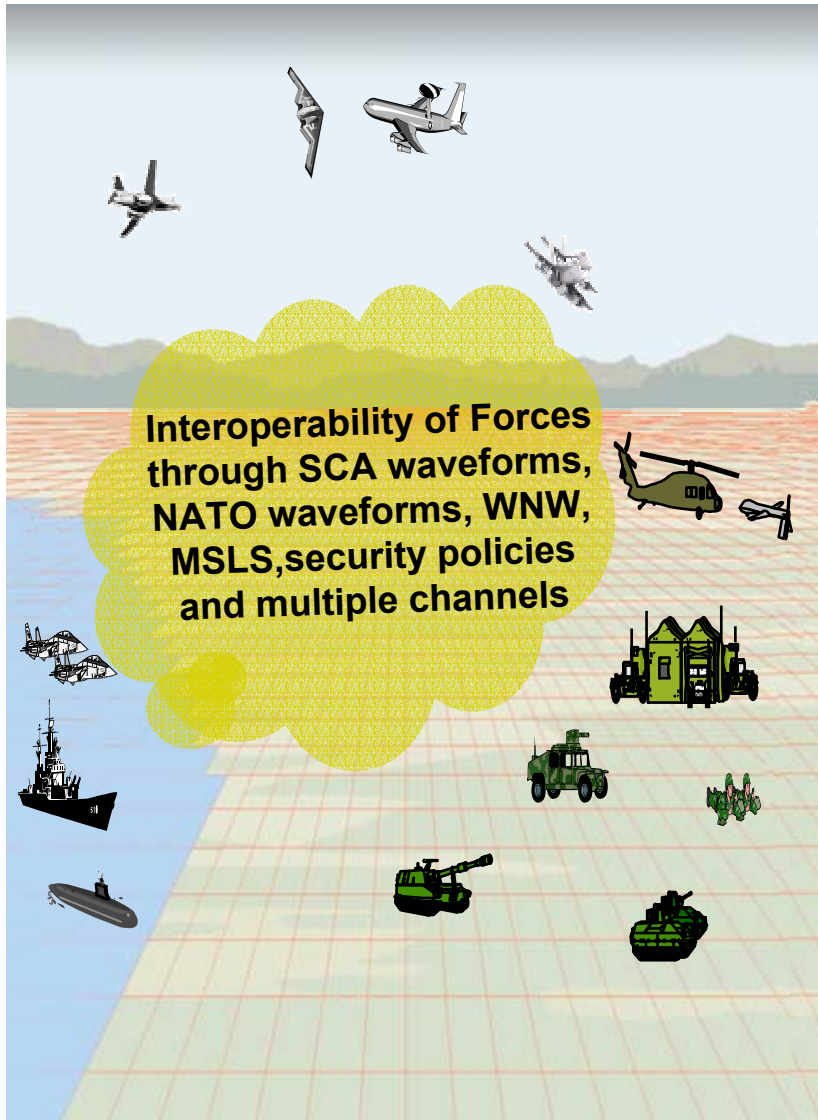
- STANAGs 5066, 4529 and 4193
- SATURN
- Links 4A, 11, 11B, 16 and 22

Multiple Single Levels of Security (MSLS)

- Unclassified to Secret Simultaneously
- US, NATO, Coalition Simultaneously

Software Communications Architecture (SCA)

- Waveforms on demand
- Waveforms changed in field by operator
- Unique NATO/Coalition SCA Compliant Waveforms downloadable



JTRS – A Transformation Enabler

Current Systems
(25-30 Families)

- Navigation
- Positioning
- Location
- Identification
- Air to Ground
- Air to Air
- Ground to Ground
- SATCOM


AN/PSQ-6A EPLRS


AN/ARC-210

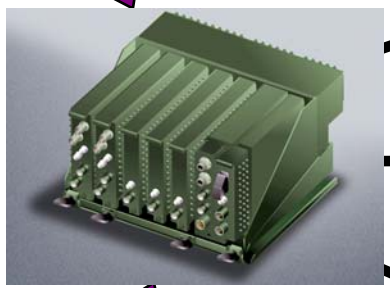

AN/WCS-3 UHF SATCOM/LOS


AN/ARC-201A SINCGARS


ANPRC-119 SINCGARS


AN/PSC-5

Common Open Standards Architecture & Technology Base



Legacy Waveforms
Commercial Waveforms
New Military Waveforms

Joint Solutions
(1 Family)

OPERATIONAL DOMAINS

- **Airborne** *Cluster 4*
- **Maritime/ Fixed Station** *Cluster 3*
- **Ground Forces**
  - Hand held
  - Dismounted
  - Vehicular

  Clusters 1 & 2

Facilitates Interoperability

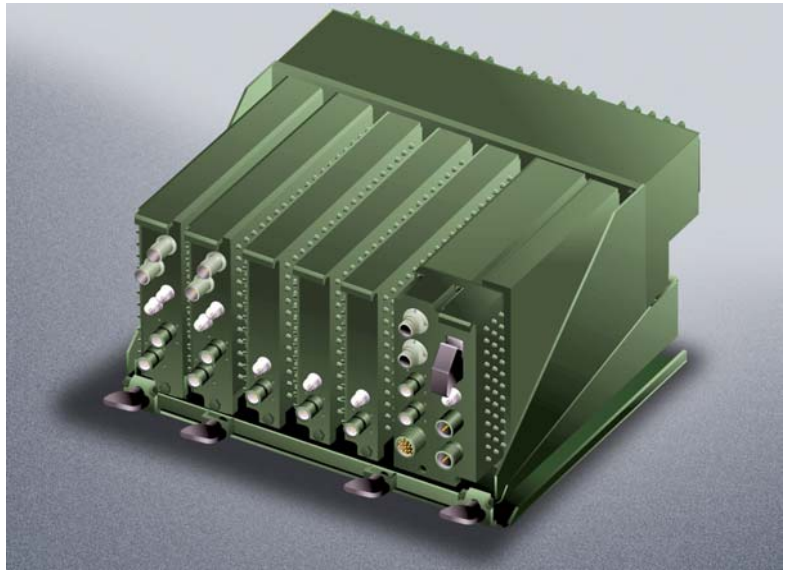
Reduces Logistics Footprint

replaces

JTRS Cluster 1 System Description

Capabilities

- Voice, Data and Video Communications
- Operational Requirement Document (ORD) Required Waveforms
- Supports Commercial Internet Protocol Routing & Tactical Internet Protocols
- Joint Tactical Architecture-Army Compliant
- Open System Architecture
- Multi-Channels
  - 6 Channels - Ground
  - 8 Channels - Rotary Wing
- Software Communications Architecture Compliant
- Routing and Retransmission (Crossbanding)
- Programmable waveforms and crypto



Characteristics/Description

- Provide the warfighter with a software-reprogrammable multi-band/multi-mode capable, networkable system.
- Provides simultaneous voice, data and video communication.
- Increase interoperability, flexibility, and adaptability in support of varied mission requirements.

Cluster 1 Program Overview

Objectives And Goals

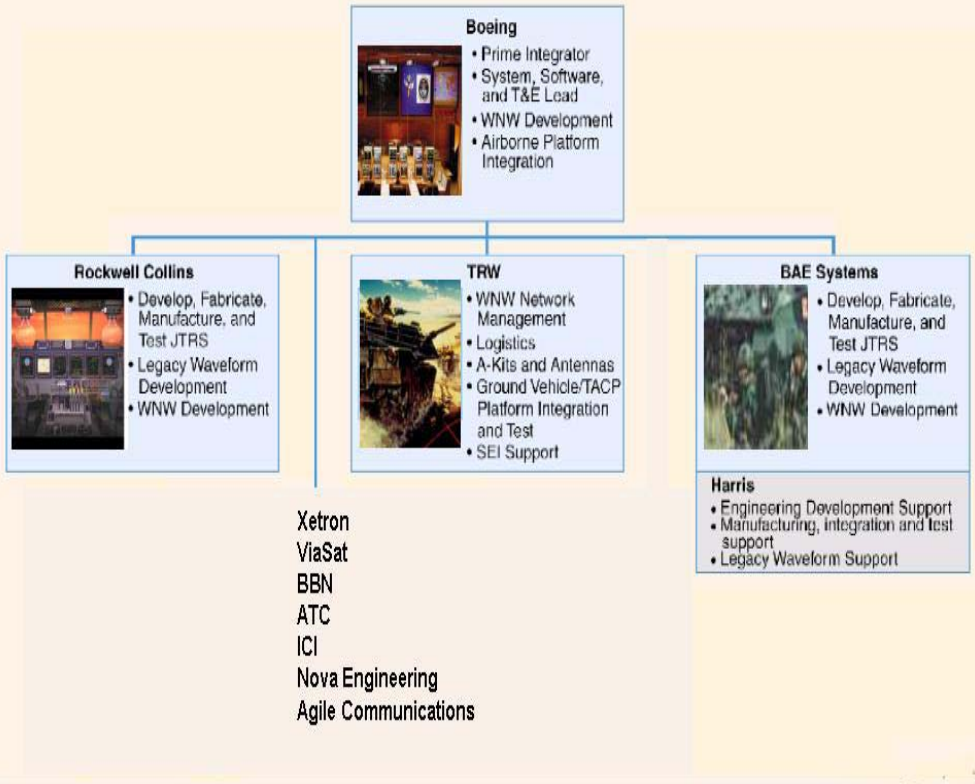
- Interoperability
- Portability of Waveforms
- Technology Insertion
- Develop & Deliver SCA Compliant Waveforms to JPO
- Develop & Deliver JTRS Compliant Radios
- Support Aviation Recapitalization Schedule
- Support FCS/Objective Force Schedule

Customer	Deliverable
JPO	SCA Compliant Waveforms (SW)
USAF	TAC-P Link 16(-) (HW)
USMC	GND Vehicular (HW)
USA	GND Vehicular Rotary Wing A/C (HW)

Program Major Milestones

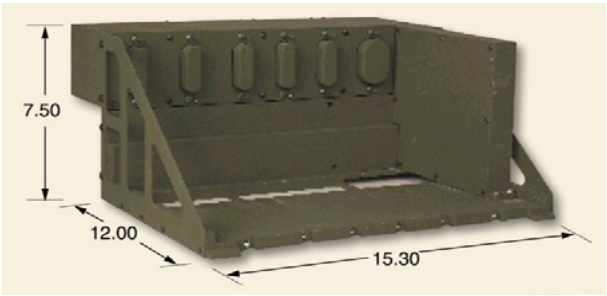
DATE	EVENT
2 Aug 01	*ASR Approval*
25 Oct 01	*RFP release*
07 May 02	*ASARC*
20 May 02	*OIPT*
03 Jun 02	*MS B Decision Review*
24 June 02	*MS B Decision*
24 June 02	*Contract Award-Boeing*
4QFY04	EOA
1QFY05	LRIP LL Approval
3QFY05	DT/OT (LUT)
2QFY06	MS C
2QFY06	FRP LL Approval
2QFY06	Exercise LRIP Option
4QFY06	MOT&E
2QFY07	FRP
2QFY07	FUE

Milestones in italics are completed

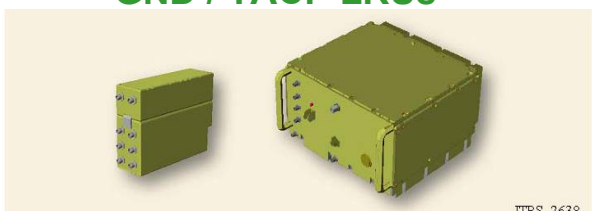


JTRS Set Overview

VEHICULAR JTR ADAPTER



GND / TACP LRUs



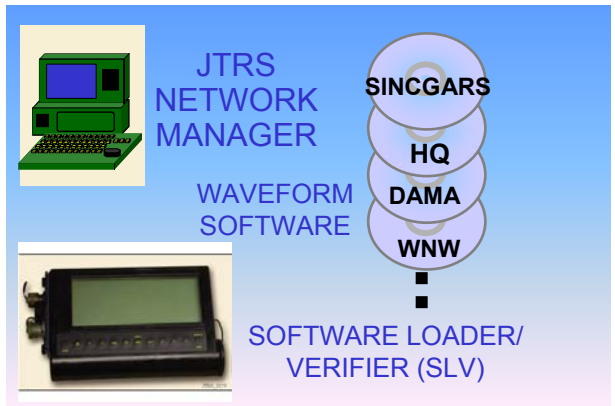
EXTERNAL COSITE DEVICES

3 CH GROUND / TACP JTR

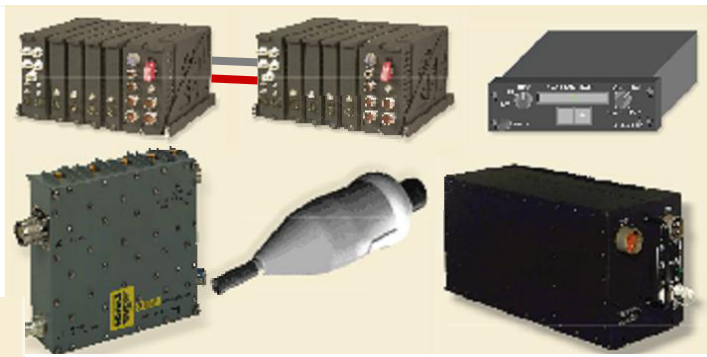
GND/TACP
TUNED/MULTIBAND/
LEGACY ANTENNAS

ILS
2-LEVEL
SUPPORT
CONCEPT

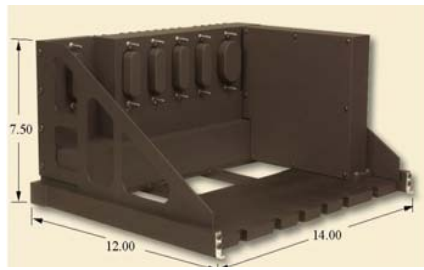
4 CH AVIATION JTR



AVIATION LRUs



AVIATION JTR ADAPTER



Cluster 1 Core Waveforms

	JPO	AR AVN	AR GRND	AF TACP	USMC GRND
® SINCGARS	X	X	X	X	X
® EPLRS	X	X	X	X	X
HF ALE (SSB)	X	X	X	X	X
HF ALE (ISB)	X	X	X	X	X
VHF AM (Voice ATC)	X	X	X	X	X
VHF Data ATC	X	X	X	X	X
® HQ II	X	X	X	X	X
® WNW	X	X	X	X	X
® UHF DAMA SATCOM 181-184	X	X	X	X	X
Link 16*	X	TBD	TBD	X	TBD

® = KPP's

** Link 16 is an AF TACP Application (not a full Link 16 waveform)

Key Performance Parameters

JTRS	Operational Logic	Demonstration Status	Status/ Trend
KPP #1	**Internal growth capability** Facilitates interoperability. Provides capability to keep pace with technology growth, provide warfighter ability to deploy a force with state-of-the art technologies. Allows hardware/software reuse, commonality of spare parts and training.	To be demonstrated in programmatic test events. Initial demonstration: Contractor Development Test (CDT) – FY04	G
KPP #2	**JTR Set modes/capabilities and Configuration and reconfiguration via software** Facilitates rapid re-configuration of the radio set to meet varying mission needs (e.g, scouts out, go to HF.) User friendly operation eliminates need for technician to configure/operate radio.	To be demonstrated in programmatic test events. Initial demonstration: CDT- FY04; Final Demonstration: Multiservice Operational Test And Evaluation (MOT&E) – FY06	G
KPP #3	**Operational Availability (OA)** Supports readiness of warfighting systems. Ensure that maintenance manpower is minimized and that the logistics system is not overburdened.	To be demonstrated in programmatic test events. Initial demonstration: Limited User Test (LUT) - FY05; Final Demonstration: MOT&E – FY06	A

Legend:
- G — On Track
- A — Not On Track But PM/SSO/RSO Solvable
- R — Not On Track. Needs Help.

- Improved from last review
- No change from last review
- Degraded from last review

Key Performance Parameters

JTRS	Operational Logic	Demonstration Status	Status/ Trend
KPP #4	**Operate on designated number of channels simultaneously** Allows multiple communications functions on different frequencies at the same time (e.g., receive video on channel 1 and data on channel 2 while talking on channel 3, all simultaneously).	To be demonstrated in programmatic test events. Initial demonstration: CDT- FY04; Final Demonstration: MOT&E – FY06	G
KPP #5	**Multi-channel routing and retransmission** Provides the capability to link networks together into a single seamless internetwork, providing transparent interoperability between JTR Set and legacy radio set users.	To be demonstrated in programmatic test events. Initial demonstration: CDT-FY04; Final Demonstration: MOT&E – FY06	G
KPP #6	**Scalable networking services** Supports dynamic(self-forming, self-healing) mobile networking, enabling battle command on the move. Scalability enables graduated levels of services to fit user's needs, to provide flexibility for different Service, platform, and form/fit needs.	To be demonstrated in programmatic test events. Initial demonstration: CDT-FY04; Final Demonstration: MOT&E – FY06	G

Legend:

G	On Track	⇧	Improved from last review
A	Not On Track But PM/SSO/RSO Solvable	⇨	No change from last review
R	Not On Track. Needs Help.	⇩	Degraded from last review

Key Performance Parameters

JTRS	Operational Logic	Demonstration Status	Status/ Trend
KPP #7	**Network extension/coverage** Supports seamless interoperability and ensures operational effectiveness. Extends the JTRS Network to all forces in an operational area regardless of artificial unit boundaries. Simplifies network routing after unit task reorganizations.	To be demonstrated in programmatic test events. Initial demonstration: CDT-FY04; Final Demonstration: MOT&E – FY06	G ⇨
KPP #8	**Support time-critical waveforms** Enables backwards compatibility with legacy radios. Provides range extension via NLOS waveforms (e.g, HF, UHF SATCOM).	To be demonstrated in programmatic test events. Initial demonstration: CDT-FY04; Final Demonstration: MOT&E – FY06	G ⇨
KPP #9	**Interoperability** Provides the means to enable users to exchange information	To be demonstrated in programmatic test events. Initial demonstration: CDT- FY04; Final Demonstration: Joint Interoperability Test Center	G ⇨

Legend:
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⇧ Improved from last review
⇨ No change from last review
⇩ Degraded from last review

Multiple Single Levels of Security

SPIRAL DEVELOPMENT

Contract Award → EOA

Phase I

-System HIGH Mode of Operation
-2 Independent Security Groups
Red Side:
Voice and Data at System High
Black Side:
Voice and Data

EOA → DT/OT/LUT

Phase II

-Initial MSLS
-2 Independent Security Groups
Red Side:
Data at System High
Voice at MSLS
Black Side:
Voice and Data

DT/OT/LUT → MOT&E

Phase III

-Final MSLS
Red Side:
Data, voice and IP at MSLS
Black Side:
Data, voice and IP

Enables simultaneous Classified and Unclassified operations

Wideband Network Waveform

JTRS Cluster 1 Milestones

	CY2002	CY2003	CY2004	CY2005	CY2006
	Contract Award	SRR SDR PDR	CDR	CDT EOA	DT/OT	MOT&E
WNW System Design		WNW Systems Requirements Complete		Support	Support	Support
WNW Spiral 1	Spiral 1 Software Development		Unicast Routing Wideband SiS IP Security			
WNW Spiral 2		Spiral 2 Software Development	SPIRAL 1	Multicast Routing AJ-LPI SiS Network Mgmt DiffServ QoS		
WNW Spiral 3				SPIRAL 2	Narrowband SiS IntServ QoS Full Network Mgmt	
			Spiral 3 Software Development		SPIRAL 3	

Provides:

- Approximately 15mbs Throughput
- Dynamic Networking
- Enhanced operations in a challenged environment

JTRS Cluster 1 Production Strategy

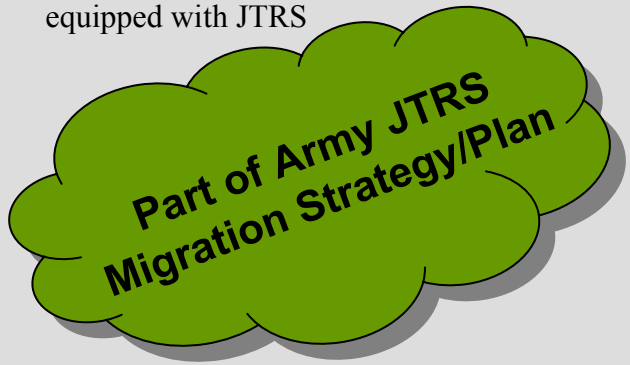
- **Phase I – MULTI-SERVICE BUY**
- **Platforms (Planned)**
  - USMC – 1,000 radios
  - AF TACP – 560 radios
  - Army Aviation – 1,361 radios
  - A2C2S – 120 radios
  - Army SBCT TOCs – 288 radios
  - Army FCS UA – 10,800 radios
  - HIMARS– 965 radios
  - SOF/TDA (15%) VARIOUS PLATFORMS – 1,616 radios

- **Production Quantity/Phase**

FY06 → FY13

QUANTITY: All Services: 16,710 Radios
Army: 15,150 Radios
Other Services: 1,560 Radios

- **Phase II – ARMY Envisioned**
- **Platforms**
  - FY13+ platform requirements will be reviewed by the G3 to determine when/or legacy systems will be equipped with JTRS



QUANTITY: FY13-FY25 quantity = 91,290
Army AAO -106,392= 104,285(ground) + 2,107(airborne-requires G3 memo change)

Summary

- Cluster 1 program is designed to provide JTRS radio products for multi-service users
- Cluster 1 will leverage technology insertion from on-going R&D efforts
- Cluster 1 supports DOD and Army Transformation

Backup Slides

Cluster 1 Non-Core/Option Waveforms

	JPO	AR AVN	ARGRND	AF TACP	USMC GRND
Non-Core Waveforms					
STANAG 4231	X	X	X	X	X
STANAG 5066	X				
STANAG 4529	X				
HF Data ATC	X				
SATURN	X			X	
UHF AM/FM PSK	X	X	X	X	X
VHF FM	X	X	X	X	X
VHF AM	X	X	X	X	X
Options					
LINK-4A	X				
LINK-11	X				